

Application No. 09/252,551

and joint" inventors of the invention. The lack of deceptive intent statement has been amended to conform more closely to the form of 37 C.F.R §1.175(a)(2).

Applicants respectfully request approval and entry of the amended reissue oath/declaration and further prosecution on the merits of the application.

Claims 1-144 were rejected under 35 U.S.C. §251, as being based upon a defective reissue declaration. In view of the amended reissue oath/declaration submitted herewith, Applicants respectfully submit that the Examiner's rejection of claims 1-144 under 35 U.S.C. § 251 is now moot.

Additionally, the Examiner has objected to the submission establishing ownership interest since the Examiner believes that the person who signed the submission has failed to state his/her capacity to sign for the corporation or other business entity, and has not been established as being authorized to act on behalf of assignee.

In response, Applicants would respectfully submit that the person signing the submission establishing ownership interest is Dr. Henry Samueli, identified as Co-Chairman of the Board and Chief Technical Officer of Assignee Broadcom Corporation. As such, Dr. Samueli is indeed an officer of the corporation and is indeed authorized to act on behalf of Assignee. Applicants would further note that MPEP 324 specifically allows the signature of the chairman of the board of directors. A co-chairman of the board of directors is nonetheless a chairman of the board of directors.

However, and in keeping with the spirit of the Examiner's objection to the submission, Applicants submit herewith a new submission establishing ownership interest which includes a proper empowerment statement identifying Dr. Samueli as one empowered to

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sign a submission establishing ownership interest and act on behalf of the organization. Entry of same is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C §§102, 103 AND 112

Claims 104-110, 116 and 119-122 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not sufficiently described in the specification.

Reconsideration and further examination are requested.

In particular, the Examiner has stated that the specification only supports adjusting the master or baud clock and not the received signals recited in claims 104 and 116. Both claim 104 and claim 116 recite the step of adjusting the phases of the digitally processed signals, not the received signals. Column 6, lines 56-59 of the above entitled specification states:

"The rate of production of the digital conversions is regulated by a timing recovery stage generally indicated at 96 so that the digital conversions of the signals from the stage 92 are at a particular rate and in a particular phase."

Columns 8 and 9 of the application more thoroughly describe the timing recovery stage which adjusts the clock signals. Column 12, lines 64-67 states:

"The phase-adjusted clock signals are introduced to the A/D converter 92 (Fig. 7) to obtain the generation of the digital conversions by the converter."

Applicant submits that the specification clearly supports the step of adjusting the digitally processed signals recited in claims 104 and 116. Applicant also submits that independent 119 is also supported by the specification.

The Examiner stated that claim 123 is not supported because the original disclosure did not disclose the step of regulating the

automatic gain control of the analog signals in accordance with the gain of the digital signals. The applicant would like to direct the Examiners attention to Figure 7 of the drawings and column 7, lines 42-56 of the written description. The Applicant submits that the drawing and text clearly discloses this step. For these reasons, the Applicant submits that the rejected claims comply with the first paragraph of section 112.

Claims 104-114, 131-139 and 141-144 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness. In particular, certain language in claims 104, 105, 106, 108, 111, 113, 115 and 117 was objected to by the Examiner.

In response, and with regard to the rejection of claims 104-114, Applicants have amended these claims in order to address the Examiner's concerns. Applicants have carefully crafted the language of these claims in order to clearly define the particular features of the present invention.

Further, claims 131-133, 135-137, 139, 141 and 143 were deemed indefinite as apparatus claims depending from a method claim. In response, Applicants have amended these claims in order to establish their proper dependency relationships. In addition, Applicants have amended claims 134 and 144 to establish a proper dependency relationship, such that the first timing loop of line 2 has sufficient antecedent basis.

Accordingly, applicants respectfully submit that claims 104-114, claims 131-139 and 141-144 are set forth in sufficiently definite terms in order to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

Claims 104-118 were rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 5,276,711 to Rossi (the '711 patent) in view of purportedly admitted prior art.

Applicants respectfully traverse this rejection.

As to claims 104-106, 108, 109, 111, 113, and 115-117, Rossi is relied on for disclosing substantially all the features of the claims except for data signals in the form of packets. The Examiner relies on the assertion that it would be obvious to transmit data in packet form in Ethernet networks because to do so would avoid long message retransmission if an error occurs, to remedy this deficiency in Rossi.

Independent claims 104 and 111 are each directed to a method of processing signals having predetermined characteristics at particular phases of the signals. The method of these claims specifically calls out the step of providing timing signals having the particular phases and having the predetermined characteristics at the particular phases. In independent claims 115 and 117, successive timing signals are provided, with times being selected at which the timing signals are predicted to provide for the occurrence of the individual ones of the particular characteristics.

Rossi is not understood to disclose or suggest any of the above-mentioned features. Rossi does not disclose or suggest providing timing signals and particularly does not disclose or suggest providing timing signals having particular phases and having the predetermined characteristics at the particular phases. Accordingly, since Rossi does not suggest these basic elements, Rossi cannot be construed as disclosing as selecting times at which the timing signals are predicted to provide for the occurrence of

the individual ones of the particular characteristics, as required by the claims.

The mere assertion that it would be obvious to transmit data in packet form does nothing to remedy the deficiencies of Rossi as a reference. Transmitting data in packet form still does not disclose or suggest the timing signal provision and predictive features of the invention as set forth in the claims. Further, the Examiner's motivation statement is not well understood by Applicant, since the invention has nothing to do with retransmission, or with error determination.

As to claims 107, 110, 112, 114, and 118, they depend from claims 104, 111, 115, and 117 and partake of the novelty thereof. Accordingly, Applicant would request reconsideration and withdrawal of the rejection of claims 104-118 under 35 U.S.C. §103(a).

Claims 119, 120, 126 and 127 were rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,065,412 to Schenk (the '412 patent).

Applicants respectfully traverse this rejection.

As to independent claim 126, the claim particularly calls out providing an adaptive digital equalization of digital signals. The Schenk reference does not disclose, discuss or suggest adaptive digital equalization, and cannot be construed as covering this feature of claim 126. Adaptive digital equalization is discussed in greater detail below, in connection with claims 130 and 140, but it is sufficient to note that this feature is completely missing from the Schenk reference.

As to claims 119 and 127, both of these claims require the steps of operating on digital signals to provide timing signals indicating changes in frequency of the timing signals from a particular value, and using the timing signals to regulate the

conversion frequency of analog signals to digital signals at the particular value.

Schenk does not disclose or suggest this feature. There is no discussion in the Schenk reference that timing signals are related to any particular value. Further the Schenk timing signals are not provided by operating on digital signals (i.e., extracted from a packet), but rather generated by quantizer in response to a frame sync unit acting in combination with a correlator. Certainly, Schenk does not disclose using the timing signals to regulate the conversion frequency of analog signals to digital signals at the particular value.

As to claim 120, it depends from claim 119, and partakes of its novelty.

Accordingly, Applicants would respectfully request reconsideration and withdrawal of the rejection of claims 119, 120, 126 and 127, under 35 U.S.C. §102(b) for anticipation by the Schenk '412 patent.

Claims 121-125, 127, 128 and 129 were rejected under 35 U.S.C. §103(a) for obviousness over the Schenk '412 patent, in view of U.S. Patent No. 4,597,089 to Motley et al. (the '089 patent).

Applicants respectfully traverse this rejection.

Claims 121 and 122 depend from claim 119, the novelty of which was discussed above. Claims 127, 128 and 129 depend from claim 126, the novelty of which was also discussed above. In view of the foregoing, Applicant submits that claims 121, 122, 127, 129 and 129 contain patentable subject matter over Schenk in view of Motley.

Claims 124 and 125 depend from claim 123. Claim 123 requires, at least, the steps of providing analog signals with an automatic gain control, converting the gain regulated analog signals to digital signals, regulating the gain of the digital signals at a

particular value, and regulating the analog signal gain in accordance with the gain of the gain regulated digital signals.

The art of record is not understood to disclose or suggest these features. The Examiner acknowledges that Schenk does not show providing automatic gain control to analog signals. Motley supposedly remedies this deficiency by its mere showing of an AGC circuit coupled to a telephone line. In this regard, Applicant would draw the Examiner's attention to Figure 3, of the Motley reference. The Motley AGC is disclosed as a straight-line element, with no provision whatsoever made for its regulation. The Motley AGC cannot be regulated. It certainly cannot be regulated in accordance with the regulated gain of gain regulated digital signals.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 121-125, 127, 128 and 129, under 35 U.S.C. §103(a) over the Schenk '412 patent in view of the Motley et al. '089 patent.

Claims 130 and 140 were rejected under 35 U.S.C. §103(a) for obviousness over the purportedly admitted prior art in view of U.S. Patent No. 5,065,412 to Schenk (the '412 patent). According to the Examiner, FIGs. 3 and 4 of the application purportedly disclose all of the subject matter contained in independent claims 130 and 140 except for an A/D converter and an equalizer at each receiver. The '412 reference to Schenk is relied upon to remedy this deficiency in the purported prior art.

Applicants respectfully traverse this rejection.

Briefly, Applicants consider the invention as embodied in independent claims 130 and 140 to be the first implementation of a fully digital multi-pair bidirectional data communication system as such, the system operates upon communication signals having

individual ones of a plurality of analog levels which represent information. A plurality of signal lines are disposed in pairs and define a multi-pair communication environment with each signal line transmitting or receiving communication signals. The data communication system includes a transmitter block having a plurality of transmitters, with each transmitter coupled to a particular one of the signal line pairs and a receiver block, which includes a plurality of receivers, with each receiver coupled to particular ones of the signal line pairs.

Specifically, each receiver of the receiver block includes an analog to digital converter configured to convert a plurality of analog levels into corresponding digital signals and a fully digital adaptive equalizer, coupled to the analog to digital converter and operating on the digital signals to define information.

Neither the purported prior art of FIGs. 3 and 4 of the application nor the Schenk '412 reference is understood to disclose or suggest the foregoing, and in particular are not understood to disclose or suggest an analog to digital converter configured to convert a plurality analog levels into a corresponding plurality of digital signals and a fully digital adaptive equalizer, coupled to the analog to digital converter and operating on the digital signals to define information.

The purported prior art represented by FIGs. 3 and 4 of the application are representative of early implementations of a multi-pair Ethernet transceiver. While disclosing a multi-pair communication environment, FIGs. 3 and 4 are representative of analog implementations of a bidirectional communication transceiver. The receiver block diagram of FIG. 4 shows nothing more than a plurality of filters/couplers, each coupled to

unshielded twisted pair wiring, and each providing received signals to one of a plurality of data recovery blocks. It is well understood that data recovery blocks, obtaining at the time of the application, were implemented using analog integrated circuitry, resulting in undesirable crosstalk between channels, response nonlinearities and large space utilization of valuable integrated circuit silicon real estate.

Likewise, the Schenk '412 reference is directed to a receiver for a subscriber's station circuit for an integrated services digital network (ISD). The system disclosed in the Schenk '412 reference is adapted to a single unshielded twisted pair (a 2-wire) communication channel as opposed to a multi-pair communication channel in accordance with the invention. Further, although the Schenk '412 reference shows an A/D converter, the Schenk A/D converter is not included within a receiver which is incorporated into a receiver block, having a plurality of receivers, each receiver coupled to particular ones of signal line pairs defining a multi-pair communication environment.

Further, the Schenk '412 reference does not disclose or suggest a fully digital adaptive equalizer coupled to the A to D converter. Schenk '412 is relied upon as disclosing a leading transient equalizer and a trailing transient equalizer which are alleged by the examiner to correspond to the equalization element set forth in independent claims 130 and 140. As was the case with the data recovery blocks of FIG. 4 of the application, the leading and trailing transient equalizers of the Schenk reference would have been constructed, in large part, with analog integrated circuitry. Thus, neither the leading nor the trailing transient equalizer of the Schenk reference can be considered a digital equalizer. By the same token, the Schenk '412 reference does not

disclose, suggest, or otherwise refer to any of its equalizer elements being adaptive. This particular feature (the adaptive feature) is enabled by the fact that the equalizer called out in independent claims 130 and 140 is a fully digital equalizer. Being fully digital, as well as adaptive, allows the equalizer to train its component portions (a feed forward equalizer and a decision feedback equalizer as set forth in dependent claims 135 and 141) such that changing channel impairments are adaptively compensated by the equalizer as they occur.

With regard particularly to amended independent claim 140, neither the purported prior art of FIGs. 3 and 4 of the application, nor the Schenk '412 reference discloses or suggests an automatic gain control circuit coupled in feedback fashion to the analog-to-digital converter and operatively responsive to output signals therefrom in order to control the gain of received communication signals. Indeed, the Schenk '412 reference discloses a servo amplifier which is coupled downstream of an echo compensator/subtractor combination. Such a servo amplifier cannot be construed as an automatic gain control circuit and it is certainly not coupled in feedback fashion to the analog-to-digital converter.

Thus, in view of the foregoing, Applicants respectfully submit that independent claims 130 and 140 and dependent claims 131-139 and 141-144 which respectively depend therefrom contain patentable subject matter over any permissible combination of FIGs. 3 and 4 of the application and the '412 Schenk reference. Reconsideration and withdrawal of the rejection of claims 130 and 140 under 35 U.S.C. §103(a) is respectfully requested.

In conclusion, Applicant submits that all of the pending claims of the present application are in condition for allowance

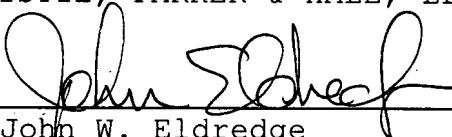
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and would earnestly solicit notification of same and early passage to reissue.

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By

  
John W. Eldredge  
Reg. No. 37,613  
626/795-9900

JWE/mg

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